

Draft

U. S. Department of Energy

Technology-Supported Learning Project Plan

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U. S. Department of Energy Technology-Supported Learning Project Plan

Purpose of the Project Plan

This project plan identifies the tasks that, once complete, will establish a corporate foundation and infrastructure required to implement technology-supported learning throughout the Department of Energy. This foundation and infrastructure will ensure that technology-supported learning efforts across the Department are systematically accomplished, sustainable over time, and coordinated in such a way as to derive the greatest benefit and cost savings. This Plan will be amended as new tasks are identified.

Introduction

The ability of the Department of Energy to successfully and safely complete its current and future missions depends heavily on the technical competence of its Federal staff and contractors. As missions change and mission-related technology advances, the Department is challenged with retraining its workers and cultivating an environment wherein employees can learn faster, retain more of what they have learned, and do so at lower costs than traditional methods of instruction permit. This challenge could not come at a better time. As the Department restructures its information management capabilities, workforce training and development via electronic means is now within our grasp. For this reason the Department's training and information management communities have partnered and initiated the Technology-Supported Learning Program. The ultimate goal of this effort is to use advanced training technology to deliver learning activities to the desktop wherever such delivery is can be demonstrated to improve learning outcomes and reduce costs.

In 1995, the Department began to place emphasis on technology-supported learning. This came as the result of an initial Departmental study concerning both 1.) the role of technology in learning and 2.) its applicability to the Department of Energy environment. A recent Presidential memo validates the Department's decision to formally integrate the use of technology-supported learning. The memo directs that a government-wide effort be undertaken to explore how technology can support life-long learning. The Department, in support of this directive, is now moving forward with this Plan documenting its approach to implementation. The ties between the Technology-Supported Learning Program goals and the Presidential Memo appear in Table 1.

Scope of the Project Plan

This Plan describes the organization, functions, and work breakdown required, over the

next two years, to establish the corporate foundation and infrastructure for technology-supported learning. The Plan has been written consistent with the requirements contained in DOE Order 430.1, Life Cycle Asset Management.

This Plan identifies what needs to be accomplished to establish the needed foundation and infrastructure. How these tasks are accomplished will be the responsibility of the Implementation Team (to be formed subsequent to the approval of this Plan). This group will determine the sequence, approach, schedule, and costs associated with each of the tasks.

All elements of this Project Plan are in concert with the Department's Strategic Information Management Plan. This Project Plan is largely based on 1.) input received from the Technology-Supported Learning Program Committee meeting conducted March 3-5 1998 in Washington D. C. and 2.) the three recommendations excerpted from the Department's Technology-Supported Learning Business Case (DOE/HR-0177, available through the Government Printing Office, or at the Department's on-line Clearinghouse for Training, Education, and Development at <http://cted.inel.gov/cted>). The recommendations are as follows:

- **Develop a corporate approach to Technology-Supported Learning**

Technology-Supported Learning will improve learning effectiveness; on-the-job performance; the quality, standardization, and consistency of training; and increase the overall system efficiency through reduced redundancy and decreased learning time.

- **Adopt a multi-technology solution for delivery of cross-cutting education and training**

This solution proposes the use of a mix of existing technologies across the Department, optimizing their function as the state-of-the-art matures, and investigating new technologies as they evolve.

- **Establish and cultivate needed resources**

Acquire resources to support implementation through partnering agreements, establishment of Centers of Excellence, development of appropriate in-house course conversion capabilities, and development of an approved list of vendor products and services.

The Partners and Their Goals

The partners in this effort, the training and information management communities, share common goals. The Department of Energy has a need to manage its information

strategically and to ensure the integrity of its information systems. Critical to successful learning is the availability, organization, and presentation of data and information. As such, the effectiveness of the Department's information management processes are integral to the success of the Technology-Supported Learning Program. Examination of some of the primary drivers for the missions of the training and information management communities further highlights how the communities, and their efforts, are integral to one another.

The Department takes a strategic view with respect to its human resources by ensuring that the training and professional development needed by its Federal and contractor staff are timely, accessible, and relevant to the job. Training drivers for the Department include:

- Department of Energy Implementation Plan responding to Defense Nuclear Facilities Safety Board Recommendation 93-3.
- Department of Energy Training and Development Business Plan
- *The Government Performance and Results Act - 1993*
- Presidential Memo of January 30, 1998 - Enhancing Learning and Education Through Technology (applies to Technology-Supported Learning Program only)
- DOE Order 360.1, Training (Federal employees)
- DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities (Contractor employees)

The redesign of the Department's information management infrastructure is being undertaken to accomplish two primary goals. The first is to streamline and integrate legacy systems into singular applications (e.g., PeopleSoft Federal Version 7.0 as the Department's new Corporate Human Resource Information System). The second is the need to ensure that all information systems and applications are Year 2000 compliant. There are several primary drivers for the Office of Information Management's efforts:

- *The Government Performance and Results Act - 1993*
- *The Paperwork Reduction Act - 1995*
- *The Clinger-Cohen Act - 1996* (also known as the Information Technology Management Reform Act)

- The Department of Energy Strategic Information Management Plan

These drivers, while having different sources, focus on many of the same fundamental principles as do the information management communities' drivers; chief of which is maximum access to information in a universal, systematic and sustainable way. As a result, both communities enter the partnership with the same vision of the cultural outcomes to be achieved through their collaboration. These include:

- Justifiable and defensible budgets based on solid performance measures
- Sustained and mutually beneficial collaboration between the two communities
- Widespread and uniform access to corporate systems facilitating interoperability and ease of use
- Mutual commitment to the quality of services and products
- Ease of facilitating agreement concerning the future direction

Applicability

The policy and directives derived from this Plan are applicable to the Department of Energy and its contractors. Implementing documents will be written to cover Technology-Supported Learning management practices by each of the participants consistent with the schedule for implementation such that there is consistency between the resulting procedures and this document.

Vision and Mission

Vision Statement

Learning needs in the Department of Energy will be efficiently and effectively met through a mix of traditional instructional methods and the use of compatible technology-supported learning tools, which will continually improve learning effectiveness.

Mission Statement

The mission of the Technology-Supported Learning Program is to systematically identify and analyze the Department's learning needs and, where TSL is determined to be the medium, facilitate the identification and development of technology-supported learning-based solutions and instructional methods.

Presidential Memorandum	Technology-Supported Learning Goals
a.) ...use best commercial practices when purchasing instructional software;	<p>Goal 1 - Identify equipment, technology, and other resource requirements and baselines for the effective implementation of technology-supported learning.</p> <p>Goal 9 - Optimize the use of existing technology-supported learning facilities and capabilities.</p> <p>Goal 11 - Provide optimal training and educational opportunities throughout the Department of Energy to maintain technical competence.</p>
b.) ...work with business, universities, and other appropriate entities to foster a competitive market for electronic instruction;	<p>Goal 8 - Develop a cooperative relationship with other government agencies, the private sector, universities, laboratories, and other educational institutions involved in technology-supported learning to share resources, products, and lessons learned.</p> <p>Goal 9 - Optimize the use of existing technology-supported learning facilities and capabilities.</p>
c.) ...develop a model technical approach to facilitate electronic instruction building on existing agency efforts...;	<p>Goal 4 - Identify learning activities that have cross-cutting applicability that would make them candidates for implementation via technology-supported learning approaches.</p> <p>Goal 5 - Develop standards for technology-supported learning format, structure, and process that will promote uniformity, reduce duplication of effort, and improve usefulness.</p> <p>Goal 6 - Identify evaluation criteria and parameters to measure the instructional effectiveness and cost savings associated with technology-supported learning as an alternative to conventional learning activity delivery.</p> <p>Goal 7 - Conduct pilots to validate system readiness, demonstrate the effectiveness of technology in improving learner outcomes, and evaluate cost vs. performance.</p> <p>Goal 9 - Optimize the use of existing technology-supported learning facilities and capabilities.</p> <p>Goal 10 - Eliminate redundancies in cross-cutting training and education, course development and delivery to reduce costs, increase efficiency, achieve the highest quality courses, and establish Department-wide consistency.</p> <p>Goal 11 - Provide optimal training and educational opportunities throughout the Department of Energy to maintain technical competence.</p>
d.) ...develop and support a program of research that will accelerate the development and adoption of new instructional technologies;	<p>Goal 2 - Evaluate the readiness of the Department and the policies and standards required to optimally harness technology-supported learning</p> <p>Goal 3 - Identify instructional strategies and methods that will improve the quality and effectiveness of technology-supported learning activities</p> <p>Goal 6 - Identify evaluation criteria and parameters to measure the instructional effectiveness and cost savings associated with technology-supported learning as an alternative to conventional learning activity delivery.</p> <p>Goal 10 - Eliminate redundancies in cross-cutting training and education, course development and delivery to reduce costs, increase efficiency, achieve the highest quality courses, and establish Department-wide consistency .</p>

Table 1 - Relationship of the Presidential Memo to Established Technology-Supported Learning Goals

Background

The Technology-Supported Learning Business Case

In April 1997 the Department completed an extensive Business Case that examined the current state of training in the Department. The focus was on quantifying cost-savings and other tangible benefits to be achieved through the use of technology in learning environments. The results were dramatic. The Business Case revealed how the use of technology could save the Department tens of millions of dollars in just the first five years of implementation. The Business Case compared the current primary method of classroom instruction to a proposed multi-technology-supported approach to learning that would use interactive television, multimedia, and computer-based training. From the Business Case results, it was determined that the initiative should be adopted as a Department-wide program. This Project Plan is the next major step towards implementation of this Program.

The Technology-Supported Learning Resource Assessment

In an effort to update the Business Case technology baseline, a Department-wide Resource Assessment was initiated. The purpose of this assessment is to gather current baseline information concerning the state of training and technology-based support infrastructure across the Department. The Resource Assessment is a web-based tool coupled with a database that can be continuously updated. This tool will be used to track the Department's progress in implementing the Technology-Supported Learning Program.

Assumptions and Benefits

Assumptions

The following list of assumptions is provided to further define the boundaries and issues associated with implementation of this Plan. Some of these assumptions pertain to the Department, others are completely grounded in the pace of technology developments. All affect the Department's ability to implement the Program.

1. Cost, scope, and schedule for each of the tasks listed in this Project Plan will be developed by the Implementation Team(s) consistent with resources available to complete each task.
2. A network of training and information management representatives from Department of Energy HQ, Field, and contractor organizations will be established to provide a knowledgeable and consistent resource to support implementation activities.

3. Technology-Supported Learning activities will occupy an ever expanding role in the delivery of content required to support all developmental, professional, and technical qualification programs.
4. Technology-Supported Learning infrastructure will be integrated with the Corporate Human Resource Information System.
5. The Department's infrastructure will continue to evolve allowing greater use of technology-supported learning.
6. System security measures will be integrated consistent with Departmental policies.
7. Partnering and resource sharing between Department of Energy Program Offices, Field Offices, and Management and Operating Contractors will be the primary tool of implementation and is key to success.
8. Alliances between the Department, other agencies of the government, institutions of higher education, and the private sector will further support implementation and reduce costs.
9. Use of technology-supported learning activities from universities and the commercial sector will be encouraged and expanded as the Department's technology-supported learning capabilities and infrastructure mature.

Benefits

The use of Technology-Supported Learning offers the Department many potential and tangible benefits that have been extensively documented as a result of implementing similar programs in government and industry. This Plan has been developed to exploit as many of these benefits* as possible. The Department's expectations include:

1. Reduced learning time - typically 30-40% less time is required compared to classroom instruction. Translated into productivity terms the worker spends more time on the job and less time in the classroom.
2. On-demand learning - instruction is available when and where the learner needs it. There is no need to wait for a scheduled class or to travel to a geographically distant location. Increases access to learning for the disabled.
3. Increased motivation - students report that they find technology-based interactive learning more interesting and enjoyable than classroom lectures.

4. Increased achievement - when corrective feedback or a mastery learning strategy is provided, students often show better test results, retention, and/or job performance from technology-based interactive learning.
5. Improved quality control - since learning experiences are delivered in the same way each time, they are much more consistent and reliable than classroom instruction.
6. Increased safety - learners can learn about and practice dangerous procedures without a safety concern.
7. Greater flexibility - fluctuations in the number of learners or their backgrounds can be accommodated more easily than with classroom instruction.
8. Improved accountability - automatic collection of data on learner performance can verify that the learning has been achieved and identify learning problems.
9. Faster revision - to the extent that learning activities are delivered via network, changes and updates to information can be made immediately.
10. Reduced delivery costs - once developed, technology-based interactive learning is likely to cost less relative to labor intensive classroom instruction. It can also be used instead of expensive and/or sensitive equipment.
11. Learner controlled - each learner is able to review topics or to skip the information that they already know.

* The above list, based on a variety of sources, was published in the U. S. Distance Learning Association publication *ED Journal*, Volume 10 #6, June 1996.

Organization

The Technology-Supported Learning Program is supported by a Department-wide team composed of both training and information management representatives. The program manager for this effort is Mr. George Cannode, Manager of the Office of Training and Information Management, Rocky Flats Environmental Site. Two senior technical advisors from each of the communities of interest support Mr. Cannode. Representing the training community is Ms. Tanya Luckett, Office of Training and Human Resource Development-HR-31. A senior technical advisor representing the information management community will be appointed.

The Technology-Supported Learning Program Manager reports directly to the Training and Development Management Council and the Secretary's Executive Committee for Information Management .

Roles and Responsibilities (Discrete roles and responsibilities for all entities listed will be determined by the Implementation Teams.)

Technology-Supported Learning Program Manager

- Coordinates, controls, and directs the program and all associated activities
- Provides management control for the TSL program
- Oversees the development of plans, schedules, and partnership activities

Technology-Supported Learning Program Advisors

- Provides technical support and counsel to the Program Manager
- Provides liaison with their technical counterparts to ensure the program is consistent with other Departmental initiatives
- Identifies training and information management technical resources, respectively, to support implementation

Training and Development Management Council and Coordinating Group

Information Management Council

Federal and Contractor Training Managers

Director, Office of Training and Human Resource Development

- Champion and sponsor for the program, the Director will work with the program manager to ensure the program is implemented in a consistent, efficient and effective manner across governmental organizations (National Economic Council, Office of Personnel Management, etc.)

Secretary's Executive Committee for Information Management

Chief Information Officer

Technology-Supported Learning Project Plan Work Breakdown Structure

The following Work Breakdown Structure (WBS) establishes the infrastructure needed for the Department to coordinate crosscutting technology-supported learning projects and achieve the economies of scale associated with the development and implementation of technology-supported learning processes and products. Upon completion of these tasks, the necessary infrastructure will be in place so that current and future products will be accessible by and useful to all sites.

The WBS identifies the means by which technology-supported learning can be exploited throughout the Department in a consistent and, at the same time, flexible manner. The workscope sets forth a set of tasks that will enable the following throughout the Department: (1) uniform deployment and easy accessibility to technology-supported learning activities, (2) optimum use of technology-supported learning and (3) increased awareness and understanding of the value of using technology-supported learning at individual sites, as well as “corporately.”

The WBS consists of three main groupings: (1) Project Management, (2) Technology-Supported Learning Systems and Information, and (3) Technology-Supported Learning Infrastructure. It is necessary that the tasks in this plan provide a solid foundation for site-specific implementation plans.

1. Project Management

1.1 Planning and Budgeting - Includes tasks that involve strategic planning, tactical planning, site coordination, and developing and maintaining TSL activities at the department level.

Identify funding strategies for implementation

1.2 Direction, Implementation, and Administration - Includes tasks necessary to effectively organize and manage the TSL project. Specifically includes development and coordination of partnerships, development and enforcement of TSL policies and standards, and providing leadership to the TSL Program.

Define the TSL participants by site, organization, and/or office

Form Partnerships - Partnerships and teams will be formed, comprised of DOE, other agencies, private sector, and educational members, to support strategic TSL decision-making and ensure maximum leveraging of TSL capabilities occurs.

Partner with external organizations to bring new TSL activities to the Department

1.3 Develop Procedures, Policies and Guidelines - Includes a set of documents that clearly describe how to make decisions concerning the use of TSL, the specifications that TSL products should meet, and how to leverage the TSL infrastructure.

Revise 360.1 in accordance with TSL policies

Develop ROI guidance

Develop TSL courseware standards for interoperability

Develop uniform navigation architecture

Integrate Departmental computer/network security requirements

Establish on-line testing criteria

1.4 Project Assessment and Evaluation - includes tasks that involve developing standard instruments for measuring project success and the effectiveness of TSL learning. These include:

Develop performance measures for program success

Develop standard instruments to measure learning effectiveness

Measure TSL cost effectiveness and return on investment

Measure the quality of instruction provided

2. TSL Information and Systems

2.1 Establish TSL Baseline - A TSL baseline will be established and periodically updated to support tactical and strategic TSL decisions.

2.2 Create TSL Information Network - The information network will be designed to provide efficient access to TSL information and resources. The information and resource types include personnel expertise, vendors, learning institutions, learning materials, courseware needs, lessons learned, and current and future TSL initiatives. The information network includes but is not limited to the following:

Develop a TSL Home Page as the one-stop-shopping mall for TSL information and materials

Establish a CTED link to TSL-based courses.

Develop a TSL resource database

Complete the DOE Universal Catalog

2.3 TSL Integration - Define strategies for ensuring requirements and standards for TSL and other Department initiatives affecting TSL are in alignment. This includes:

CHRIS implementation - Federal Training Administration, course registration, course catalog, and training documentation

93-3 Recast - learning material requirements and fulfillment of competency requirements

DOE Order 360.1 rewrite

2.4 Develop and Implement TSL Marketing Strategies - Initiatives undertaken to communicate the availability and value of TSL throughout the Department by both the Federal and contractor workforce.

Develop TSL Communications Plan to include advertising and marketing strategies

Develop recognition and reward systems

2.5 TSL Research and Development - Includes efforts to stay abreast and ahead of the curve on TSL advances. This includes:

Conduct benchmarking of organizations both inside and outside of the Department.

Assess new evolving TSL activities

Pilot new technology

3. TSL Infrastructure

3.1 Hardware and software implementation - This activity addresses any hardware, software, equipment, and network required to (1) facilitate efficient

use of TSL between sites and (2) meet TSL architecture needs that reside outside the individual site boundaries. This includes:

Procure TSL hardware and software (Capital equipment line item)

Install, test, and implement TSL hardware and software

3.2 Develop user help/support system - This includes developing the support infrastructure for the TSL user community. Tools and services include:

Assess and modify media selection tools/criteria

Establish on-line help system

Provide instructional staff TSL training

Provide tools, templates, and algorithms for calculating ROI

Performance Objectives

The technology supported learning program is anchored by three performance objectives that form the starting point for the development of all subsequent performance measures. They are:

1. Quality - A consistently high level of quality in learning materials
2. Transportability - Learning materials can be readily accessed and used by all sites.
3. Cost savings - Documented savings are achieved in the analysis, design, development, and delivery of learning materials.

The specific performance measures for the tasks in this plan will be developed by the implementation teams responsible for their execution based on these objectives.

Appendix A

Technology-Supported Learning and the Information Management Principles

The Office of Information Management, charged with developing and defining an information architecture for the Department, developed eight principles of philosophy for the information system. The DOE training community's initiative to use advanced technology to deliver learning activities fully supports these principles. Adherence to these principles is fundamental to the success of the technology supported learning (TSL) program. The eight principles and their relationship to TSL are:

Principle #1 DOE information products and services are user-centric and customer-driven.

One of the primary goals of the technology supported learning initiative is to use advanced technology to deliver learning activities directly to the customer at their convenience. This means minimizing travel and time away from the job. Ultimately, it means delivering training at their desktop wherever such delivery is practical, cost-effective, and productive.

Principle #2 DOE Information Architecture is based on modular components.

A modular approach to information management is complimentary to TSL. The training community recognizes the need to be able to upgrade delivery methods of training as technology changes. This also allows a gradual shift to TSL as funding and user needs warrant.

Principle #3 Information architecture is based on an open systems approach.

Interoperability is a key component to the success of the TSL program. To reach the greatest number of customers, an open systems approach to the design and development of technology-based courses will be encouraged.

Principle #4 Security is designed into all architectural elements, balancing accessibility and ease of use with protection of data.

Security is recognized as an important issue that must be considered as the TSL program is implemented. The guidance issued by the Office of Information Management states that "To provide open access and maintain information protection, security must be implemented at the data level rather than the application level." In most cases, TSL products are being delivered at the application level. Where data is a consideration, the training community will work closely with the information management community to ensure that the appropriate level of security is maintained.

Principle #5 Information is not only a Departmental asset but also a national asset for which DOE staff is the steward.

The training community agrees that we must act as stewards of the information and data that is available to citizens. It is expected that Departmental training products will be shared with other agencies, universities, and private industry. For this reason, the training community agrees that stewardship, rather than ownership, encourages information use without sacrificing security or data integrity.

Principle #6 DOE-wide access to information is the rule rather than the exception.

The Technology Supported Learning initiative is fully compatible with this principle. The TSL approach is designed to incorporate several technology supported learning delivery methods including interactive television, multimedia, computer based training, and Internet web-based training. Use of these technologies will help to ensure that access to learning activities is Department-wide.

Principle #7 The information architecture incorporates a robust interface that optimizes the nature, efficiency, and effectiveness of the human operator.

As a stakeholder in information technology development, the training community is fully cognizant of the man-machine interface requirements in development of a system. Human factor engineering will be an integral part of the design and development of technology-based learning activities.

Principle #8 DOE will have an information technology infrastructure that links offices, programs, facilities, and field locations together seamlessly.

The success of the TSL initiative relies on the fulfillment of this principle. An information technology infrastructure needs to be in place to fully realize the benefits of delivering the anticipated learning activities through technology in an efficient and cost-effective manner.